

We claim:

- Sub
B1
1. A dual wafer stage assembly, comprising:
a base;
a first stage movable in a plane on said base;
5 a second stage movable in said plane on said base;
a plurality of interferometers mounted on said base with a corresponding plurality of
moveable mirrors mounted on said first stage and said second stage wherein said
interferometers, said first and said second stages, and said moveable mirrors are configured
and dimensioned to allow for continuous determination of a position of each said stage at
10 any position.
2. A dual wafer stage assembly according to claim 1, wherein said first and said second
stages differ in dimension when measured in the direction perpendicular to said plane.
- 15 3. A dual wafer stage assembly according to claim 1, wherein said first and said second
stages differ in at least one dimension in said plane.
4. A dual wafer stage assembly according to claim 1, claim 2, or claim 3, wherein a
first said moveable mirror on said first stage and a second said moveable mirror on said
20 second stage reflect alternatively to a common subset of said plurality of interferometers and
where said second moveable mirror is larger than said first moveable mirror in at least one
dimension such that a region is created where said second moveable mirror is larger than
said first moveable mirror and where at least one of said plurality of interferometers utilizes
said region in the continuous determination of the position of said second stage.
25
5. A dual wafer stage assembly according to claim 4, wherein said second stage and
said second moveable mirror are the same dimensions in the plane of said second moveable
mirror.
- 30 6. A dual wafer stage assembly according to claim 4, wherein said second moveable
mirror is sectioned with at least one of said sections offset from the other said section in the
direction parallel to the axes of said subset of interferometers

35

7. A dual wafer stage assembly according to claim 6, wherein said second moveable mirror is sectioned such that one of said sections is approximately the same dimensions as said stage supporting said section.

5 8. A dual stage assembly, comprising:
a base;

a plurality of interferometers mounted on said base for determination of stage positions, said interferometers each including at least one interferometer axis directed towards a moveable mirror;

10 a first stage moveable in a plane between multiple positions on said base and having at least a first moveable mirror mounted thereon; and

a second stage moveable in said plane between multiple positions on said base and having at least a second moveable mirror mounted thereon, said first and second stages being moveable to positions wherein the first stage eclipses the second stage with respect to

15 said at least one said interferometer;

wherein said first and second moveable mirrors are configured to reflect to a common subset of interferometer axes, said second moveable mirror having a reflecting surface that cooperates with said interferometers in said eclipsing positions such that the position of said second stage is continuously determinable.

20

9. A dual stage assembly according to claim 8, wherein said first moveable mirror's reflecting surface eclipses said first stage from said common subset of interferometers.

10. A dual stage assembly according to claim 9, wherein said second moveable mirror's
25 reflecting surface eclipses said second stage from said common subset of interferometers.

11. A dual wafer stage assembly according to claim 8, wherein the reflecting surface of at least one of said moveable mirrors is comprised of sections.

30 12. A dual wafer stage assembly according to claim 8, wherein the reflecting surface of at least one of said moveable mirrors is comprised of sections and at least one of said sections is not co-planar with the remaining sections.

35

13. A dual wafer stage assembly according to claim 8, wherein said second moveable mirror extends beyond said second stage along the dimension defined by the intersection of the plane of said mirror and the plane of said stage.

5 14. A dual wafer stage assembly, comprising:
a base;
a first stage movable in a plane on said base;
a second stage movable in said plane on said base; and
a plurality of interferometers mounted along one side of said base which are directed
10 to a first moveable mirror mounted on said first stage and a second moveable mirror mounted on said second stage where said plurality of interferometers and moveable mirrors cooperate to continuously determine the position of both said stages such that if said first stage is interposed between second said stage and at least one of said interferometers said second stage position is determined by at least one other of said interferometers.

15 15. A dual wafer stage assembly according to claim 14, wherein said second moveable mirror is larger than said first moveable mirror in a dimension of said mirrors' reflecting surface.

20 16. A dual wafer stage assembly according to claim 15, wherein said second stage and said second moveable mirror's reflecting surface are of approximately the same dimensions.

17. A dual wafer stage assembly according to claim 14, further comprising:
a second plurality of interferometers are mounted along a second side of said base
25 where said second side is perpendicular to said first side of said base;
a third moveable mirror mounted on said first stage and a fourth moveable mirror mounted on said second stage where said second plurality of interferometers and said third and said fourth moveable mirrors cooperate to continuously determine the position of both said stages such that if said first stage is interposed between second said stage and at least
30 one of said second plurality of interferometers said second stage position is determined by at least one other of said second plurality of interferometers.

18. A dual wafer stage assembly, comprising:
a base;
35 a first stage movable in a plane on said base;

a second stage movable in said plane on said base wherein said second stage is larger than said first stage in at least one dimension of said plane; and

a plurality of interferometers and moveable mirrors wherein said interferometers are mounted on said base and said moveable mirrors are mounted on said first and said second stages and said interferometers and said moveable mirrors are configured to facilitate the continuous determination of the positions of said stages, and where one or more portions of said moveable mirrors mounted on said second stage are located on said second stage where said second stage is larger than said first stage.

10 19. A method of utilizing a dual stage assembly where stage position is determined using interferometers, the method comprising:

sizing a first stage and a second stage based on a determined size and exposure apparatus parameters;

15 providing a plurality of interferometers directed in parallel at said stages and dispersed along one side of an area in which said stages will travel such that each of said stages' positions intersect an axis created by at least one of said plurality of interferometers at all times during the movement of said stages;

equipping said first stage with a first movable mirror dimensioned to allow said interferometers to determine said first stage's position in a first desired direction;

20 equipping said second stage with a second movable mirror dimensioned to allow at least one of said plurality of interferometers to determine said second stage's position in said first desired direction even if said first stage should be positioned between said second stage and said dispersed interferometers;

moving said first and said second stages in said area; and

25 determining said first stage's position and said second stage's position in said first direction using at least one of said plurality of interferometers for each of said stages' positions at all times.

20. A method of utilizing a dual stage assembly where stage position is determined using interferometers according to claim 19, the method further comprising:

providing at least one first orthogonal interferometer directed at said stages from a second side of said area and directed orthogonally to said first plurality of interferometers;

30 providing at least one second orthogonal interferometer directed at said stages from a third side of said area and directed orthogonally to said first plurality of interferometers and directed parallel to said at least one first orthogonal interferometer;

equipping said first stage with a third moveable mirror and said second stage with a fourth moveable mirror, said third and fourth mirrors configured and dimensioned to reflect to said at least one first orthogonal interferometer;

5 equipping said first stage with a fifth moveable mirror and said second stage with a sixth moveable mirror, said fifth and sixth mirrors configured and dimensioned to reflect to said at least one second orthogonal interferometer, said at least one first orthogonal interferometer and said at least one second orthogonal interferometer and said third, fourth, fifth, and sixth moveable mirrors configured to determine said first and said second stages' positions in said orthogonal direction at all times during said stages' movement; and
10 determining said first stage's position and said second stage's position in said orthogonal direction at all times during said movement using said orthogonal interferometers.

15

20

25

30

35